SAINIK SCHOOL AMBIKAPUR
HOLIDAY HOMEWORK: 2025-26
SUBJECT: PHYSICS
CLASS: XII

Important Instructions

- The homework has to write in separate 'A4 rule - pages' and the front page must be decorated. Please don't write it in your note book.
- No stick file is required. It should be stapled only.
- The class work must be completed in your class note book.

S.No	HOMEWORK
1	State Coulomb's law of electrostatics. Also write its limitations.
2	Explain the properties of electric charge with examples.
3	(a) Define electric flux. Write its S.I unit. (b) State Gausses law of electrostatics. Does the charge given to a metallic sphere depend on whether it is hollow or solid? Give reason for your answer.
4	Define capacitance of a capacitor. Derive its expression for parallel plate capacitor without dielectric and with dielectric also.
5	(a) Define dipole moment of a dipole. (b) What are dielectrics? (c) Define electric polarization.
6	Write the properties of electric field lines. Why two field lines cannot intersect each other?
7	Define drift velocity. Derive the relation between drift velocity and electric current.
8	(a) State Ohm's law. Write its vector form. (b) What is mobility?
9	State Kirchhoff's law. Derive the expression of balance condition of a whetstone's bridge.
10	Derive the expression of E and V : (a) At a distance r from a charged straight wire. (b) At nearby point of a charged sheet. (c) At outside, on the surface and inside a charged spherical metallic body.
11	If p = 2i +4j +5k and E = -5i +6j +2k then find the (a) Torque acting on the dipole (b) How much Potential energy is stored
12	A charge 'q' is placed at the centre of a cube of side l. What is the electric flux passing through each face of the cube?
13	Derive the expression of E and V at axial point and equatorial point of an electric dipole having charge -q and +q separated by a distance of 2a.

14	What is the direction of the electric field at the surface of a charged conductor having charge density $\sigma < 0$?
15	Two charges of magnitudes -3Q and + 2Q are located at points (a, 0) and (4a, 0) respectively. What is the electric flux due to these charges through a sphere of radius '5a' with its centre at the origin?
16	Write the expression for the work done on an electric dipole of dipole moment p in turning it from its position of stable equilibrium to a position of unstable equilibrium in a uniform electric field E.
17	Show on a plot the nature of variation of the (a)Electric field (E) and (b) Potential (V), of a (small) electric dipole with the distance (r) of the field point from the centre of the dipole.
18.	A charge q is enclosed by a spherical surface of radius R. If the radius is reduced to half, how would the electric flux through the surface change?
19	A spherical conducting shell of inner radius rx and outer radius r2 has a charge 'Q'. A charge 'q' is placed at the centre of the shell. (a) What is the surface charge density on the (i) inner surface, (ii) outer surface of the shell (b) Write the expression for the electric field at a point $x > r_2$ from the centre of the shell.
20	Under a uniform electric field, find the electric flux of the field through a square of 5 cm on a side whose plane is parallel to the Y-Z plane. What would be the flux through the same square if the plane makes a 30° angle with the x-axis?
21	**Just go through the CBSE Question paper (Set-A/B/C) of class 12 (2025) and solve any one set.**